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A Record of the Invasive Slug *Veronicella cubensis* (Pfeiffer, 1840) in California

R. J. MC DONNELL,[1,2] A. HANSEN,[1] T. D. PAINE[1] AND M. J. GORMALLY[2]

[1]Department of Entomology, University of California, Riverside, California 92521, U.S.A.
(e-mails: rory.mcdonnell@ucr.edu; allison.hansen@email.ucr.edu; tpaine@ucr.edu)
[2]Applied Ecology Unit, Centre for Environmental Science, National University of Ireland, Galway, Ireland
(e-mails: mike.gormally@nuigalway.ie)

Abstract. *Veronicella cubensis* (Pfeiffer, 1840) is reported from California for the first time and the significance of the find in terms of agricultural production and the effectiveness of invasive gastropod screening at air and seaports within the state are discussed.

Following a survey of the invasive slug fauna of California, we present the first record of *Veronicella cubensis* (Pfeiffer, 1840) (Stylommatophora: Veronicellidae) on the west coast of North America. A single individual was collected under a potted plant in a garden center in Santa Barbara, California (N34°24″908″, W119°45.018″) on 19th June 2006. Other slug species collected in the same location were *Deroceras reticulatum* (Müller, 1774), *Deroceras panormitanum* (Lessona and Pollonera, 1882), *Lehmannia valentiana* (d'Audebard de Férussac, 1823) and *Arion hortensis* d'Audebard de Férussac, 1819. The specimen has been deposited at Department of Malacology, Academy of Natural Sciences in Philadelphia under catalogue number ANSP-A21201.

Although having a highly variable coloration (including an albino form), the notum of *V. cubensis* is usually dark to pale brown (Figure 1), generally with a pale dorsomedian line. It often has black speckling which sometimes fuses to form two lateral bands (Robinson and Hollingsworth, 2004). The female genital pore is located closer to the pedal sulcus than the peritoneum. The penis has a characteristic flaring that produces a blade-like structure down each side and the penial gland has numerous, very long tubules (David G. Robinson, pers. comm.).

It is thought that *V. cubensis* is native to Cuba (Robinson and Hollingsworth, 2004) but it has also been introduced to Jamaica (Baker, 1925), Bahamas, Haiti, Dominican Republic, Puerto Rico, Guam (Thomé, 1993a), Antigua, Saint Kitts and Nevis, Dominica, Barbados (West Indies), St. Coix, Olosega (Manu 'u Islands), Tutuila (American Samoa), Pohnpei (Micronesia), Rota, the Northern Mariana Islands (Robinson and Hollingsworth, 2004) and Hawai'i (Thomé, 1993b). It has also been previously collected (interceptions) in Florida and New Orleans (Thomé, 1993a).

In 2002, *V. cubensis* was listed as the seventh most potentially damaging gastropod of either agriculture or natural ecosystems if it became established in the U.S. (Cowie, 2002). Since this species was introduced into Hawai'i in 1985, it has caused severe damage to vegetable, ornamental, and landscape plants, and the species is now a potential threat to Hawai'i's $104 million vegetable and floriculture industry (Hata et al., 1997). The species is also an extremely serious agricultural and horticultural pest on Rota and Guam (Robinson and Hollingsworth, 2004). In addition, *V. cubensis* has been associated with the transmission of the trematode *Angiostrongylus cantonensis* (Chen) which causes the potentially lethal eosinophilic meningitis in humans (Cuba: Aguiar et al., 1981; Jamaica: Lindo et al., 2004)

Although our record is of a single specimen and return trips to the same location and surrounding areas on 2 August 2006 and 14 March 2007 did not yield any additional individuals, our discovery is still of concern as it indicates that some potentially severe pest gastropods are not being detected during pre-clearance at U.S. seaports, airports and border crossings. Such failed interceptions represent the first step in establishment of exotic species in the U.S. and as such these finds should be reported as they may help to prevent further invasions and the ultimate establishment of pestiferous species. Although some species may not be of concern at their port of entry, they represent a source for transport to other areas of the U.S. and the world, where they could potentially become established and become serious pests. In the case of *V. cubensis*, spread of individuals to areas such as New Orleans could result in such a scenario. In addition, *V. cubensis* is predominantly a tropical to subtropical species (Gomes and Thomé, in press) and heavily-irrigated desert areas in southern California, including extensive and diverse urban landscape environments, may be a vulnerable habitat for colonization, as they are likely to provide the hot, humid conditions favored by tropical gastropods

Figure 1. Specimen of *Veronicella cubensis* (Pfeiffer, 1840) collected in Santa Barbara, California.

such as *V. cubensis*. It is therefore imperative that improved screening of shipments that are known to harbor invasive slugs and snails e.g., tiles, fruit, vegetables and ornamentals (Robinson, 1999) are put in place to help mitigate the problem of invasive gastropods in the U.S.

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Personnal Communications:

(1) David G. Robinson, USDA APHIS PPQ, Department of Malacology, Academy of Natural Sciences, 1900 Ben Franklin Parkway, Philadelphia, Pennsylvania 19103, U.S.A.